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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/578,010

05/03/2006

Dorian A. Canelas

IR-2989 (EA)

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LORD CORPORATION
PATENT & LEGAL SERVICES
111 LORD DRIVE
CARY, NC 27512

EXAMINER

FEELY, MICHAEL J

ART UNIT

PAPER NUMBER

1796

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/578,010	Applicant(s) CANELAS ET AL.	
	Examiner Michael J. Feely	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Pending Claims

Claims 1-6 are pending.

Priority

1. The instant application is a National Stage Entry of PCT/US04/17749, filed June 2, 2004, which claims benefit to U.S. Provisional Application No. 60/524,007, filed November 21, 2003. Based on the supporting nature of the provisional application, the effective filing date for the instant claims is November, 21, 2003.

Information Disclosure Statement

2. The listing of references in the Search Report is not considered to be an information disclosure statement (IDS) complying with 37 CFR 1.98. 37 CFR 1.98(a)(2) requires a legible copy of: (1) each foreign patent; (2) each publication or that portion which caused it to be listed; (3) for each cited pending U.S. application, the application specification including claims, and any drawing of the application, or that portion of the application which caused it to be listed including any claims directed to that portion, unless the cited pending U.S. application is stored in the Image File Wrapper (IFW) system; and (4) all other information, or that portion which caused it to be listed. In addition, each IDS must include a list of all patents, publications, applications, or other information submitted for consideration by the Office (see 37 CFR 1.98(a)(1) and (b)), and MPEP § 609.04(a), subsection I. states, "the list ... must be submitted on a separate paper." Therefore, the references cited in the Search Report have not been considered.

Art Unit: 1796

Applicant is advised that the date of submission of any item of information or any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the IDS, including all "statement" requirements of 37 CFR 1.97(e). See MPEP § 609.05(a).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The list of oligomeric materials set forth in claim 5 are intended to further limit the monofunctional unsaturated photocurable component set forth in claim 2; however, these oligomeric materials do not appear to be *monofunctional* materials.

The limitation of claim 6 is unclear; however, based on the specification, it appears that the claim should read, *further comprising an ethylenically unsaturated oligomer, wherein the oligomer has a number average molecular weight of from 500 to 5,000.*

Claim Rejections - 35 USC § 102/103

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1796

7. Claims 1 and 2 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ma et al. (US 2003/0141592 A1).

Regarding claim 1, Ma et al. disclose: **(I)** an ambient temperature stable integrated circuit wafer having an active side adhered to an underfill composition (Abstract), said underfill composition comprises a photo-cured, one-part composition (paragraphs 0013, 0021, and 0025) comprising a one part mixture of:

(A) a liquid photocurable acrylate component (paragraphs 0015, 0021, and 0025);

(B) a polyfunctional epoxy resin (paragraphs 0015, 0021, and 0025);

(C) at least one photoinitiator (paragraph 0045);

(D) a non-electrically conductive filler (paragraph 0044); and

(E) non-fluxing heat activated epoxy curative (paragraphs 0033-0036).

Regarding claim 2, Ma et al. disclose a liquid, 100% solids, non-self fluxing one-part underfill (Abstract; paragraphs 0013, 0021, and 0025), comprising:

(A) from 5% to 30% of a monofunctional unsaturated photocurable component (paragraphs 0015, 0021, and 0025);

(B) from 10% to 45% of a polyfunctional epoxy resin (paragraphs 0015, 0021, and 0025);

(C) from 0.3% to 3% of at least one photoinitiator (paragraph 0045); and

(D) from 40% to 70% of a non-electrically conductive filler (paragraph 0044).

Ma et al. do not explicitly disclose, “wherein the underfill in a solid thermoset state exhibits a flexural modulus of from 1000 to 5000 MPa at 25°C, and a CTE below the glass transition temperature of said underfill composition of from 15 to 50 ppm/°C.” However, it appears that these properties would have been inherent in the composition of Ma et al. because

Art Unit: 1796

they satisfy all of the material/chemical limitations of the instant invention. In light of this, it has been found that, “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that Ma et al. inherently or obviously satisfy the instantly claimed property limitations because they satisfy all of the material and chemical limitations of the instant invention.

8. Claim 1 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Forray et al. (US 2004/0102566).

Regarding claim 1, Forray et al. disclose: **(I)** an ambient temperature stable integrated circuit wafer having an active side adhered to an underfill composition (Abstract; paragraph 0012), said underfill composition comprises a photo-cured, one-part composition (Abstract; paragraphs 0010-0014) comprising a one part mixture of:

- (A) a liquid photocurable acrylate component (paragraphs 0098 and 0103-0117);
- (B) a polyfunctional epoxy resin (paragraphs 0019-0023);
- (C) at least one photoinitiator (paragraph 00149-0155);
- (D) a non-electrically conductive filler (paragraph 0161); and
- (E) non-fluxing heat activated epoxy curative (paragraphs 0138-0145).

Forray et al. do not explicitly disclose, “wherein the underfill in a solid thermoset state exhibits a flexural modulus of from 1000 to 5000 MPa at 25°C, and a CTE below the glass

Art Unit: 1796

transition temperature of said underfill composition of from 15 to 50 ppm/^oC.” However, it appears that these properties would have been inherent in the composition of Forray et al. because they satisfy all of the material/chemical limitations of the instant invention. In light of this, it has been found that, “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that Forray et al. inherently or obviously satisfy the instantly claimed property limitations because they satisfy all of the material and chemical limitations of the instant invention.

Claim Rejections - 35 USC § 103

9. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al. (US 2003/0141592 A1) in view of Sakuyama et al (US 2003/0080397 A1).

Claims 3 and 4 further limit the photocurable component to include a list of **(3)** short chained alkyl esters of acrylic acid and short chained alkyl-substituted short chained esters of acrylic acid; and **(4)** specific acrylates and methacrylates (*see instant claim for list*). Ma et al. provide a very non-descript discussion of suitable acrylic compounds, other than the fact that they are radiation curable.

Sakuyama et al. disclose an underfill composition that is based on photosensitive acrylate materials (*see paragraph 0076*). The list of acrylate materials includes the embodiments set forth in instant claims 3 and 4. The teachings of Sakuyama et al. demonstrate that these specific embodiments of the photocurable component are recognized in the art as suitable radiation curable acrylic compounds for underfill compositions. In light of this, it has been found that the selection of known material based on its suitability for its intended use supports a *prima facie* obviousness determination – *see MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the specific photocurable components of instant claims 3 and 4, as taught by Sakuyama et al., in the composition of Ma et al. because Sakuyama et al. demonstrate that these specific materials are recognized in the art as suitable radiation curable acrylic compounds for underfill compositions.

Art Unit: 1796

10. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al. (US 2003/0141592 A1) in view of Yamamura et al. (US Pat. No. 6,287,745).

Claim 5 further limits the photocurable component to include a list of **(5)** unsaturated oligomers (*see instant claim for list*). Claim 6 further limits the photocurable component of claim 4 to **(6)** also feature an ethylenically unsaturated oligomer having a number average molecular weight of from 500 to 5000. Ma et al. provide a very non-descript discussion of suitable acrylic compounds, other than the fact that they are radiation curable.

Yamamura et al. disclose an underfill composition that is based on photosensitive acrylate materials (*see Abstract; column 7, line 60 through column 10, line 21*). The list of materials include the monomers set forth in claim 4 (*see column 8, lines 19-20*) and the oligomers set forth in claims 5 and 6 (*see column 9, lines 5-6*), as well as combinations of these materials (*see column 9, lines 48-65*). The teachings of Yamamura et al. demonstrate that these specific embodiments of the photocurable component (and mixtures thereof) are recognized in the art as suitable radiation curable acrylic compounds for underfill compositions. In light of this, it has been found that the selection of known material based on its suitability for its intended use supports a *prima facie* obviousness determination – *see MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the specific photocurable components of instant claims 5 and 6, as taught by Yamamura et al., in the composition of Ma et al. because Yamamura et al. demonstrate that these specific materials (and mixtures thereof) are recognized in the art as suitable radiation curable acrylic compounds for underfill compositions.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/
Primary Examiner, Art Unit 1796

June 23, 2008